

Drug Overdose Surveillance Interactive Data Report: Technical Notes

Data Sources

Note about overdose-related emergency department (ED) visits during the 2020 coronavirus (COVID-19) pandemic: The total number of ED visits significantly decreased during 2020, which makes Rates per 10,000 Visits difficult to interpret during this time. Please see corresponding population-based rates during this time.

Data for emergency department (ED) visits related to overdose is from Pennsylvania's syndromic surveillance system, EpiCenter, which collects data from 171 of the 171¹ Emergency Departments in Pennsylvania. Some facilities provide diagnosis codes and triage notes, which allows for greater sensitivity in detecting overdose events. However, many classifications are based on chief complaints.

Chief complaints may be captured by a) dropdown menus, which generally do not allow for inclusion of specific drugs involved in an overdose or b) free text fields, which are subject to challenges associated with linguistic variation, including:

- a single symptom can be described in multiple ways by using synonyms and paraphrases;
- medical concepts are often recorded using abbreviations and acronyms that are idiosyncratic to individual hospitals;
- the same concept can be indicated with different parts of speech;
- words are frequently misspelled or mistyped in busy medical settings, causing the continual appearance of new, previously unseen errors²

Additionally, the possibility of variations in process at a given facility, including personnel-specific variations that can change by shift and policy-driven variations that change over longer periods of time can potentially affect syndromic surveillance data. While EpiCenter employs a variety of approaches to address these concerns, counts should be interpreted with caution. Monitoring trends associated with syndromic surveillance is much more useful and the reason why rates are provided instead of counts. Please be aware that not all overdose victims go to an emergency room and not all emergency departments in the Commonwealth report overdoses through syndromic surveillance.

Data for overdose deaths comes from two sources: 1) Death certificate data provided by the Bureau of Health Statistics and Registries, and 2) Pennsylvania Coroners and Medical Examiners.

2017 Any Drug Overdose Death Estimates come from 2017 death certificate data as of 1/2019, 2018 Any Drug Overdose Death Estimates come from 2018 death certificate data as of 1/2021 and 2019 Any Drug Overdose Estimates come from 2019 death certificate data as of 9/2021. Provisional 2020 and 2021 Any Drug Overdose Death Estimates come from 2020 and 2021 death certificate data as of 10/2022.

Confirmed Unintentional Opioid Overdose Death data for 2017 – 2018 come from the combination of death certificate data and coroner/medical examiner toxicology data for participating counties.

¹Veterans Affairs Medical Center (VAs) with emergency departments are not included in the total count of EDs.

²A. Shapiro. Taming variability in free text: application to health surveillance. MMWR Morb Mortal Wkly Rep, 53 (2005), pp. 95-100.

Confirmed Unintentional Overdose Death data for 2019 - 2022 come from the combination of death certificate data and coroner/medical examiner toxicology data for participating counties. Unintentional Overdose Deaths include those with a Manner of Death of Accidental, Undetermined and some Homicides. Counts do not include suicides or homicides where someone intended to harm another person by poisoning.

Deaths are reported by the County where the individual died.

Data Updates

Estimated Drug Overdose Death data is updated monthly. Emergency Department data is updated quarterly. Enhanced death data is updated every 6 months.

Measures

Rates and Denominators:

- Rates are not age-adjusted.
- Percent of emergency department visits related to overdose are calculated using the number of total emergency department visits for any cause for the specified group as denominators and are based on the location of the facility.
- Rate of emergency department visits related to overdose per 10,000 population measures are calculated using county/state populations as denominators and are based on the location of the patient's residence.
- Percentages for Enhanced Data for Confirmed Accidental Overdose Deaths are calculated using the number of total confirmed accidental overdose deaths in participating counties and are based on the location of the death.
- Rates of overdose deaths per 10,000 population are calculated using county/state populations as denominators and are based on the location of the patient's residence.
- Rates per 10,000 population in 2021-2022 are calculated using county/state denominators from 2020/2021 and will be updated as more recent estimates become available.

Defining Categories – Emergency Department Data:

- **Any Drug Overdose** includes overdoses of any substance, including over-the-counter, prescription and illicit drugs.
- **Any Opioid Overdose** includes overdoses of any opioid substance, including prescription and illicit opiates, such as heroin and illicitly manufactured fentanyl.
- **Heroin Overdose** includes overdoses where the chief complaint or medical notes indicate suspicion of heroin or diagnosis codes indicate heroin as the cause of the overdose. This information may not be based on laboratory testing and results may include cases related to fentanyl overdoses as well.
- **Stimulant Overdose** includes overdoses of any prescription stimulant medication, such as methylphenidate, or illicit stimulants, such as cocaine and methamphetamine.

Defining Categories – Overdose Death Data:

This data shows substances that are indicated as cause of death on the death certificate. When the death certificate does not specify what drugs are responsible (e.g. Multiple Substance Toxicity), all substances listed on the toxicology report are indicated as a cause of death.

Overdose Deaths are classified using the International Classification of Diseases, Tenth Revision (ICD–10). Drug-poisoning deaths are identified using underlying cause-of-death codes X40–X44 for Accidental (aka Unintentional) manners of death; Y10–Y14 for Undetermined manner of death, and include:

- R99 when the Injury Description indicates an overdose death.
 - X49 when literal COD is Mixed or Combined or Multiple Substance Toxicity, as these are likely drug overdoses
 - X47 when substance indicated is difluoroethane, alone or in combination with other drugs
 - X85 when the manner is Homicide, but there is no evidence that another person intended to harm someone via poisoning.
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- **Any Drug** includes overdoses of any substance, including over-the-counter, prescription and illicit drugs, but excluding alcohol-only overdoses.
 - **Any Opioid** includes overdoses of any opioid substance, including prescription and illicit opiates, such as heroin and illicitly manufactured fentanyl.
 - **Stimulant** includes overdoses of any prescription stimulant medication, such as methylphenidate, or illicit stimulants, such as cocaine and methamphetamine.
 - **Heroin** includes overdoses where heroin is suspected as the cause of death.
 - **Any Fentanyl** includes all overdoses where fentanyl, regardless of origin, is indicated as a cause of death. This variable is used in the Fentanyl + other drugs categories.
 - **Illicit Drugs Only** overdoses where the only drugs contributing to death are illicit drugs.
 - **Prescription Drugs Only** overdoses where the only drugs contributing to death are prescription drugs.
 - **Prescription + Illicit Drugs** overdoses where both illicit and prescription drugs contribute to death.
 - **Benzodiazepine** include overdoses where a benzodiazepine contributes to cause of death.
 - **Cocaine** include overdoses where a cocaine contributes to cause of death.
 - **Methamphetamine** include overdoses where a methamphetamine contributes to cause of death.
 - **Died within One Month of Release from an Institution**, where an institution is defined as jail, a supervised residential facility, or a psychiatric hospital.
 - **Died within One Month of Release from Jail**, where jail is defined as any local, county, state or federal jail/prison.
 - **Evidence of a Bystander Present at Time of Overdose** is defined as the presence of one or more individuals over the age of 10 at the location during the time of the overdose identified by the coroner/medical examiner report.
 - **Evidence of Current Pain Treatment (Acute or Chronic)** is defined as the overdose victim being treated for any type of pain at the time of the fatal overdose as identified by the coroner/medical examiner report.
 - **Evidence of Current Substance Abuse Treatment** is defined as the victim receiving any form of treatment for any substance use disorder within the month preceding the fatal overdose as identified by the coroner/medical examiner report.
 - **Evidence of Ever Receiving Substance Abuse Treatment** is defined as the victim ever receiving any

form of treatment for any substance use disorder as identified by the coroner/medical examiner report.

- **Evidence of Naloxone Administration** is defined as any indication from the coroner/medical examiner report or toxicology report, that the victim received naloxone in response to the fatal overdose.
- **Evidence of Recent Relapse** is defined as the victim returning to using opioids after a period of not using for at least one week as identified by the coroner/medical examiner report.
- **Location of death (home, ED, hospital inpatient)** as listed on the death certificate.
- **Mental Health Diagnosis** is defined as the victim having evidence of a mental health problem or treatment by a mental health professional at the time of their death.
- **Evidence of a Prior Overdose** is defined as the victim having a history of drug overdose prior to the fatal event.
- **Fatal Drug Use Witnessed** is defined as at least one person, aged 11 years or older, witnessing the decedent use the substance(s) that resulted in his/her overdose.

Limitations of Estimates: Due to limitations in the data collected by EpiCenter, any opioid and heroin overdoses are most likely underestimates of the proportion of visits or residents whose overdose was caused by an opiate. This is due to non-specific chief complaints which do not indicate drug(s) involved in the overdose and the relatively low number of facilities submitting diagnosis codes; as of July 2016, only 31/151 (21%) facilities submitted discharge diagnosis codes for $\geq 70\%$ of registrations. Ongoing efforts beginning in Q2 2018 have increased the number of facilities submitting diagnosis codes and medical notes, which should increase the sensitivity of the Any Opioid and Heroin Overdose classifiers; as of July 2019, 121/166 (73%) facilities submitted discharge diagnosis codes for $\geq 70\%$ of registrations. Even though these estimates have been shown to consistently underestimate the measures, they are nonetheless useful to demonstrate trends over time. In addition, as of January 2023, 31 emergency departments have been added to surveillance and 13 have closed.

Consistency with other reports: Differences with other published reports may occur due to differing case definitions or time lags. EpiCenter data changes as facilities update data while the analytic overdose data files are a snapshot in time. Additionally, data quality projects that improved submission and accuracy of race and ethnicity data, as well as submission of other data points including ICD diagnosis codes, were completed in August 2018, June 2019, and August 2022., which may impact rates by race and ethnicity subgroups

Disclaimers

The Office of Drug Surveillance and Misuse Prevention is continuously working to improve the quality and timeliness of the data. The interactive data report represents a snapshot of overdose data as of 1/2023 and is subject to change.

Death data: Death Certificate data were supplied by the Bureau of Health Statistics and Registries, Harrisburg, Pennsylvania. The Bureau of Health Statistics and Registries specifically disclaims responsibility for any analyses, interpretations, or conclusions.